

REMARKS

Claims 1-9, 11-16, and 18-32 are all the claims pending in the application. Claims 1-8, 14, 15, 21, 22, 25, and 28-32 are presently withdrawn from consideration. Claims 9, 11-13, 16, 18-20, 23, 24, 26, and 27 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ohta et al. (U.S. Patent No.: 5,737,105), hereinafter referred to as Ohta, in view of Eskildsen et al. (U.S. Patent No.: 5,959,750), hereinafter referred to as Eskildsen.

As a preliminary matter, the drawings are objected to, for the reasons set forth on page 2 of the Office Action. Specifically, the Examiner states that “the modulation of claims 9, 16; wavelength modulation means of claims 11-12, 18-19, 23-24, 26-27; the injection current of a laser of claims 13 and 20 must be shown or the feature(s) canceled from the claims(s).” In response, Applicant submits that one skilled in the art would understand where and how the types of modulation recited in the claims are implemented in the invention, at least based on the specification at least on page 7, line 12 - page 8, line 8. Further, Applicant submits the attached copy of § 1.4.2 of AGRAWAL textbook “Fiber-Optic Communications Systems”, and submits that at least based on the information provided in the text of the enclosed document and in the present disclosure, one skilled in the art would have recognized and understood where and how the injection current is implemented in the invention, as set forth in the claims. That is, the attached document discloses that, in the conventional art, a sender (transmitter) typically comprises a laser (optical source) coupled to a modulator. A current is injected into the laser by a current source (driver) and the modulator is controlled electrically in response to the data to be transmitted (see fig. 1.8 of AGRAWAL). Further, Applicant submits that if one starts with the conventional structure, as described above and in AGRAWAL, wavelength modulation (in

addition to the data modulation) can be obtained by modulating the current injected into the laser, according to the present invention (*see claim 9*). This can be obtained, for example, by modifying periodically the operating conditions of the driver. To realize instead an additional phase modulation, a phase modulator can be coupled at the output of the data modulator (as described on page 8, lines 16-17). Therefore, at least based on the foregoing, Applicant submits that one skilled in the art, at least based on the knowledge in the art (AGRAWAL, for example) and the information provided in the specification, would understand where and how the wavelength modulation, phase modulation, and injection current of the laser which are described in the claims, are implemented in the invention. Additionally, even though the aspects of the invention discussed above would have been known and understood as illustrated in the originally filed figures, Applicant submits herewith draft figures 3, 4, 5, which respectively show a conventional sender, a sender with an additional wavelength modulation, and a sender with an additional phase modulation, for the Examiner's convenience. Applicant respectively requests the Examiner's approval of these drawings, and submits that these drawings do not constitute new matter, at least because one skilled in the art, in view of the specification, would have recognized and appreciated the content of figures 3, 4, and 5 at least based on the invention as described in the original specification and figures. If the Examiner approves these drawings, Applicant would accordingly, amend the specification to refer to these drawings.

Also, as indicated on page 2 of the Office Action, the Examiner is not persuaded BY the argument presented in the previous Response to Election of Species filed March 19, 2003, that "there should not be a requirement to elect either sub-species A or B of Species II, as sub-species A and B are both directed to widening the spectrum of a signal in order to reduce the interaction

between a signal in one direction and the backscattered noise from the other direction.” The Examiner maintains that the election of species requirement is still proper. In response, for the record, Applicant maintains the previous arguments submitted in the Response to Election of Species and submits the following additional remarks. That is, Applicant submits that to obtain spectrum widening, wavelength or phase modulation results in the same optical signal modification. For widening the spectrum, the present invention proposes to provide wavelength modulation, which implicitly means modulating the carrier wavelength of the signal at a given rate. A first way to do that consists in acting on the carrier source (i.e. on the laser), prior to applying the data modulation. This can be done by modulating the electrical current injected into the laser (as shown in attached figure 4). Another way to modulate the wavelength is using an optical phase modulator, which applies phase modulation either on the carrier wave before data modulation or on the signal obtained after data modulation. Both ways can have the same effect on the resulting signal; it is well known that a periodic modulation of a carrier phase can also imply a periodic modulation of its frequency (or wavelength) and conversely. Detailed explanations can be found in basic text books dealing with modulation methods (e.g. “electrical Engineering Handbook”). Thus, using “phase modulation means” can be a particular way of realizing wavelength modulation and consequently spectrum widening. Therefore, at least based on the foregoing, Applicant maintains that there should have been no requirement to elect either sub-species A or B of Species II.

§ 103(a) Rejections (Ohta / Eskildsen) - Claims 9, 11-13, 16, 18-20, 23, 24, 26, and 27

The Examiner rejects claims 9, 11-13, 16, 18-20, 23, 24, 26, and 27 under § 103(a) for the reasons set forth on pages 3 and 4 of the Office Action.

With respect to independent claim 9, the Examiner admits that “Ohta differs from claim 9 of the present invention in that Ohta does not specific[ally] disclose [an] optical link comprising means for widening the spectrum of the signal in at least one transmission direction, wherein said means for widening the spectrum comprises wavelength modulation means,” however the Examiner alleges that Eskildsen makes up for the deficiencies of Ohta. That is, the Examiner alleges that element 36 of Fig. 2 satisfies the claimed wavelength modulation means. However, Applicant submits that element 36 of Eskildsen does not perform a wavelength modulation function but only modulates an optical signal output by an optical source 34 with digital data. See col. 3, lines 14-17 of Eskildsen. Eskildsen does not mention that modulator 36 performs a “wavelength modulation.” Therefore, for at least this reason, Applicant submits that Eskildsen does not make up for the deficiencies of Ohta, and respectfully request that the Examiner indicate that independent claim 9 is allowed.

Applicant submits that independent claim 16 is patentable for reasons similar to those set forth above for independent claim 9, as claim 16 similarly recites that “a spectrum of the signal in at least one transmission direction is widened by modulating a wavelength of the signal.”

Applicant submits that dependent claims 11-13, 18-20, 23, 24, 26, and 27 are patentable at least by virtue of their respective dependencies from independent claims 9 and 16.

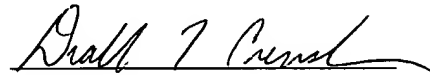
In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. APPLN. NO.: 09/297,382

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Respectfully submitted,



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